

**ASSESS THE EFFECTIVENESS OF SENSORY NURSING INTERVENTIONS ON
WEIGHT GAIN AMONG PRETERM INFANTS IN SELECTED
SETTING, NAGERCOIL, K.K. DISTRICT**

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ABSTRACT

Preterm birth is defined as childbirth occurring at less than 37 completed weeks or 259 days of gestation. Preterm birth is a global problem and evidently more than 60 % of preterm births occur in Africa and South Asia. In India preterm births is rising and presently around 21 % of babies were born preterm. Neonatal intensive care unit stimuli may interfere with brain development in premature infants and contribute to developmental delays. Statement of the Problem: A Quasi Experimental Study to Assess the Effectiveness of Sensory Nursing Interventions on weight gain among Preterm Infants in Selected Setting, Nagercoil, K.K District. A Quantitative Research Approach- Quasi experimental research design was adopted. The study was conducted on 125 each on study and control group. The investigator provided Sensory Nursing Intervention care on study group preterm infants along with routine hospital and control group was obtaining routine hospital care. Both the group was assessed with weight gain. The study concludes that the difference between the means of both study and control group was 433.0 in pre test to post test 1 assessment. In overall assessment i.e. the improvement from pre test to post test 3 was (583.8 gm) statistically significant ($P < 0.001$).

KEYWORDS: Reterm Infants, Sensory Nursing Intervention, Weight Gain

INTRODUCTION

Preterm birth is defined as childbirth occurring at less than 37 completed weeks or 259 days of gestation. Late pre-term refers to infants born between 34 and 36 weeks of gestation.

An estimation states 15 million babies born worldwide were preterm that is almost one in 10 live births. About one million infants die on each year due to complications of preterm birth. Many preterm survivors face a lifetime disability, including learning disabilities, visual and hearing problems. (WHO, November 2015)

Preterm birth is a global problem and evidently more than 60 % of preterm births occur in Africa and South Asia. On average 12% of babies are born too early in low income countries compared with 9% in higher-income countries. (WHO, 2013)

In India preterm births is rising and presently around 21 % of babies were born preterm. States such as Goa, Kerala and Manipur have infant and neonatal mortalities similar to that of developed nations, indicating advanced care of premature babies. Annually about 27 million babies were born in India, among them 3.6 million were born premature, of

which 303,600 fail survival due to complications. (Indian Foundation of preterm babies, 2014).

The first and foremost of four weeks of neonatal period, is the transition time of infant from uterus to external environment, where the infant is supported entirely by the mother to independent existence. Early physical development during this transitional period includes physical growth, feeding development, brain, neuronal reflex behavior and early sensory capacity.

Preterm infant's neurodevelopment are proactively enhanced by avoidance of overstimulation, stress, pain, isolation, and deprivation. This can be enhanced by supporting the infant's self-regulatory competence through steady availability of reliable, consistent and familiar caregivers who supports the infant's foremost nurturers in initial transitional life.

In the intrauterine environment, rhythmic stimuli are provided by maternal activity, hormonal cycles, auditory, cutaneous and kinesthetic input through the amniotic fluid and sac. One of the common experiences for the fetus is the intermittent, regular exposure to the mother's voice. The maternal voice is minimally distorted and the intonation and melodic contour are identical to the external voice, factors critical for postnatal responsiveness to voice. These stimuli provide support for function and organization for the developing fetus.

Preterm infants have been noted to benefit from massage therapy. Massage therapy using moderate pressure showed weight gained of 31 % to 49% in average. Some studies have also shown length of preterm infants, head circumference and bone mineral density increases with massage therapy.

The rhythmic stimulation of movement and intermittent speech experienced during fetal development continues even after birth. The mother's regulatory role for system organization is significantly different for infants born prematurely than for term infants, because premature infants do not experience extended contact with their mothers early in life. Evidence exists that mother's voice can be an important positive stimulus for premature infants in the neonatal intensive care unit (NICU).

Normal sensory development requires stimulation during periods of rapid brain growth. Neurodevelopment processes evolve with consistent patterns of sensory input. A premature birth represents an abrupt change in experience for the infant's developing nervous system. In the NICU, sensory stimulation is not consistent, patterned or congruent with the types of stimulation that are required for normal neonatal development. Neonatal intensive care unit stimuli may interfere with brain development in premature infants and contribute to developmental delays.

In this study, the researcher decided to find the response of physiological parameter i.e Weight Gain of infants after Sensory Nursing Intervention by the mothers towards there preterm infants.

OBJECTIVES

- To assess the pre and post test level of weight gain among preterm infants in study and control group.
- To determine the effectiveness of sensory nursing interventions on weight gain among preterm infants.
- To associate the level of weight gain with their selected demographic variables in study and control group.

RESEARCH HYPOTHESIS

- **H₀₁:** There is significant difference in weight gain between pre test and post test in study and control group.
- **H₀₂:** There is significant difference in the weight gain among preterm infants between the study and control group.
- **H₀₃:** There is significant association between weight gain among preterm infants with demographic variables in study and control group.

METHODOLOGY

Quantitative Research Approach- Quasi experimental research design. The study was conducted at neonatal preterm ICU's at Government Medical College and Hospital, Asaripallam at Kanyakumari District. Necessary ethical approval was obtained. The sample consisted of 250 patients preterm infants between the gestational ages 34 to 36 weeks who fulfil the inclusion criteria were chosen for the study by using non probability convenient sampling technique. The tool used was a demographic variables and periodic weight gain.

Section A

A semi structured interview based questionnaire was included to assess the background variables which consists of items related to demographic data of the mother and child such as; Maternal data (age, mother's educational status, occupation, parity, type of family), Neonatal data further categorized to demographic data (gender of baby, gestational weeks during birth) and Clinical (hemodynamic stability, type of birth, infant weight) data.

Section B

It consists of assessment of weight gain.

Weight Gain

Baby weight gain is assessed at the 6th day, 18th day and 30th day and compared within the group and between the groups.

DATA COLLECTION PROCEDURE

- The ethical clearance of the study setting was obtained.
- Preterm infants who met inclusion criteria were selected through convenient sampling technique in both control group and study group.
- Before approaching parents for informal consent, consent is obtained from the attending neonatologist confirming that the infant is medically stable and the consent was obtained from the mother.
- Control group infants was selected first and concern obtained from the mother, The control group preterm babies was getting routine hospital care during observational period and periodic assessment was done as per the study.
- Following Control Group, Study group infants were identified. A pretest was assessed and following the

assessment study group preterm infants received 15 minutes of intervention twice daily for 5 days.

- The sensory nursing intervention was taught to study group preterm infant mothers and procedure was demonstrated. The preterm infant mothers were observed by the researcher while doing the intervention at hospital.
- The preterm infant's mother initiates directed talk through soothing voice (auditory stimulation) to her preterm infant and massages the preterm infant for 10 minutes (tactile stimulation) following massage a 5 minutes of horizontal rocking (vestibular stimulation) was performed. Throughout the 15-minute period, the mother engages eye contact with the preterm infant (visual stimulation).
- If an infant exhibited negative disengagement cues such as hiccoughing, finger play, crying, fussing, or spitting/vomiting during the intervention, that part of the technique was discontinued and the next portion of the technique was attempted.
- Intervention was initiated 1 hour before the next scheduled feeding.
- The weight gain was assessed sensory nursing intervention on Day 1st, 6th, 18th and 30th of procedure.
- Study group preterm infant mothers maintained diary every time after demonstrating sensory nursing intervention and was observed by researcher.
- The study group preterm infant mothers performed sensory nursing intervention till late neonate period (28 days) and maintained daily diary on intervention and progress on babies.
- The day of discharge is noted for both study and control group.
- The weight of preterm infants was assessed on every post test.

Table 1

Age of New Born(in days)	Sensory nursing intervention	
	Morning	Evening

RESULTS

In both study and control groups the maximum proportions (63.2 % and 64.4 %) of mothers were in the age bracket of 25-29 years. Regarding educational status of preterm mothers 37.6% were secondary school and 34.4 % were graduates in study group whereas 45.6% and 48.8 % of preterm mothers had attained secondary and graduates in control group respectively. The house wife / Unemployed were 68.8 % in study group and 88.0 % in control group. In both groups the joint family contributions were 64 % and 76 % respectively. Regarding the parity of mother 64 % and 68 % of subjects were study and control group respectively.

The mean age of mothers in both group were 27.7 ± 3.3 years and 26.9 ± 3.2 years and were not differed significantly ($P > 0.05$). The assessment mean ages of the two groups were also not significantly different ($P > 0.05$).

The weight gains of the infants at 4th assessment were 97.6 % and 86.4 % of study and control group. The study group subjects had gained 9 % more than that of control group subjects. Both groups the weights of the babies were in increasing trend from preterm assessment to post term 3 assessments. But, from the preterm assessment to the post test 3 assessment the weight increase of study group was 999.7± 180.1 gm and the same of the control group was 405.9± 172.7 gm. The statistically significantly excess of 583.8 gm increase weight of study group was attributed to the effectiveness of nursing sensory intervention.

All the demographic characteristics of mothers and preterm infants were not associated with weight gain of both study and control groups.

The first objective of the study was to assess the pre and post test level of weight gain among preterm infants in study and control group.

Table 2: Frequency and Percentage Distribution of Pre and Post Test Level of Weight Gain among Preterm Infants in Study and Control Group N=250

Birth Weight (Kg)		Experimental Group N=125					Control Group N=125				
		at Birth	Assessment				at Birth	Assessment			
			Pretest	Post Test 1	Post Test 2	Post Test 3		Pretest	Post Test 1	Post Test 2	Post Test 3
<2.5	Fre	41	73	16	12	3	76	78	79	36	20
	%	32.8	58.4	12.8	9.6	2.4	60.8	62.7	63.2	28.8	13.6
2.5 +	Fre	84	52	109	113	122	49	47	46	89	108
	%	67.2	41.6	87.2	90.4	97.6	39.2	37.6	36.8	71.2	86.4
Total	Fre	125	125	125	125	125	125	125	125	125	125
	%	100	100	100	100	100	100	100	100	100	100

The table shows the improvement of preterm infant weight in pre and post test of study and control groups. At pre test the low birth weight i.e weight less than 2.5 kg of preterm infants were 58.4% and 62.7% in experimental and control group respectively. And normal birth weight babies were 41.6% and 37.6% in experimental and control group respectively. At post test 1, 87.2% and 36.8% of preterm infants improved above 2.5 kg in experimental and control group respectively. In post test 3 and 4 of study group 90.4 % and 97.6% attained above 2.5 kg whereas in control group 71.2 and 86.4 % preterm infant attains above 2.5 kg.

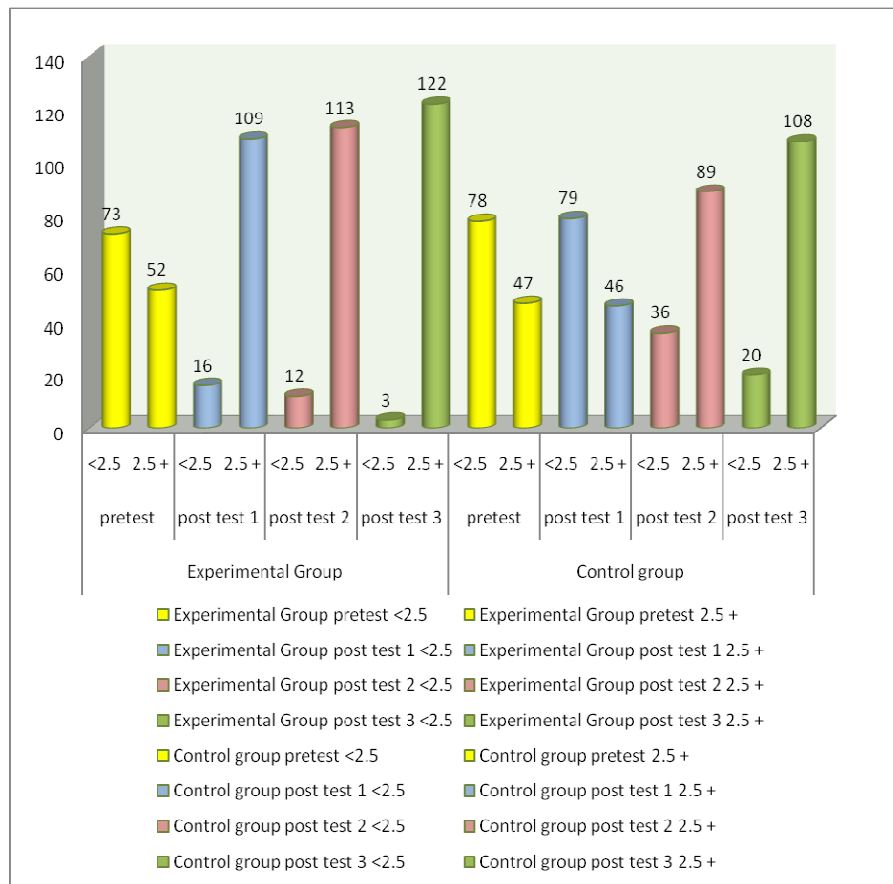


Figure 1: Bar Diagram Depicts Frequency and Percentage Distribution of Pre and Post Test Level of Weight Gain among Preterm Infants in Study and Control Group

Table 2: The Second Objective of the Study was to Determine the Effectiveness of Sensory Nursing Interventions on Neonatal Reflex and Reactivity among Preterm Infants in Study Group. N=250

Variables	Time of Assessment	Study N=125		Control N=125		Difference between Improvement	“t”	df	Significance
		Mean	SD	Mean	SD				
Weight Gain	Pretest to Post test 1	447.6	118.8	146	50.9	433.0	28.846	248	P<0.001 s = ***
	Post test 1 to Post test 2	264.8	95.5	239.5	136.1	25.3	1.702	248	P>0.05 s=ns
	Post test 2 to post test 3	464.3	139.5	151.8	91.2	312.4	20.956	248	P<0.001 s = ***
	Pretest and Post test 3	999.7	180.1	405.9	172.7	583.8	25.184	248	P<0.001 s = ***

P <0.001= *very highly significant, ns = P >0.05**

The weight gain of preterm infants from pre test to post test 3 in study group with sensory nursing intervention and control group without sensory nursing intervention are compared as below. The difference between the means of both study and control group was 433.0 in pre test to post test 1 assessment and the same was statistically very highly significant (P<0.001). But the improvements between the groups in post test 1 to post test 2 assessment was not statistically significant (P>0.05). The improvement in post test 2 to 3 assessment was statistically very highly significant (P<0.001). In overall assessment i.e. the improvement from pre test to post test 3 was (583.8 gm) statistically significant (P<0.001).

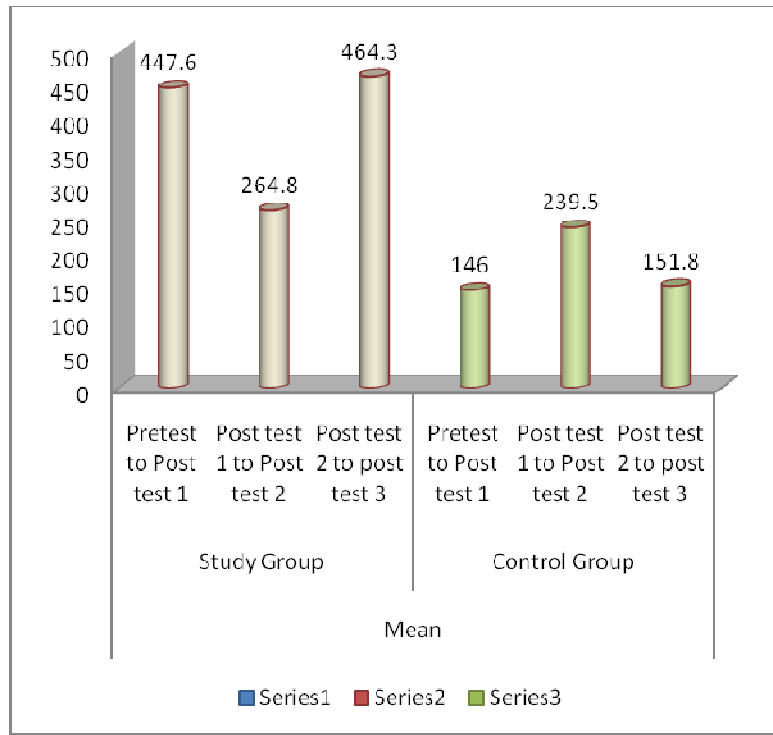


Figure 2: Bar Diagram Depicts Effectiveness of Sensory Nursing Interventions on Neonatal Reflex and Reactivity among Preterm Infants in Study Group

The Third Objective of the Study was to Associate the Weight Gain with their Selected Demographic Variables in Study and Control Group

The demographic characteristics of study subjects of study groups were associated with Age, Occupation, Education, Type of family and Parity of mother and Gestational age, Birth and Sex of neonatal.

Table 3: Association between the Weight Gain with Their Selected Demographic Variables in Study and Control Group. N=250

Sl. No	Demographic Variables	Study Group (N=125)				Control Group (N = 125)			
		Low	Normal	Total	Result	Lo w	Norm al	Tota l	Result
I	Maternal Data(in ages)								
	20-29	54	40	94	$\chi^2 = 0.142$ df = 1 P>0.05 s=ns	65	40	105	$\chi^2 = 0.069$ df = 1 P>0.05 s=ns
	30-39	19	12	31		13	7	20	
	Total	73	52	125		78	47	125	
2	Educational status								
	Non Educated	1	1	2	$\chi^2 = 0.362$ df = 1 P>0.05 s=ns	0	0	0	$\chi^2 =$ df = 1 P>0.05 s=ns
	Primary school Education	18	15	33		3	4	7	
	Secondary school Education	28	19	47		38	19	57	
	Degree and above Education	26	17	43		37	24	61	
	Total	73	52	125	78	47	125		
3	Occupation								
	Skilled	11	11	11	$\chi^2 = 0.791$	7	2	9	$\chi^2 = 2.298$

Table 3: Contd.,									
	Non Skilled	10	7	10	df = 2	5	1	6	df = 2
	House wife/ unemployed	52	34	52	P>0.05 s=ns	66	44	110	P>0.05 s=ns
	Total	73	52	73		78	47	125	
4	Type of Family								
	Nuclear	27	18	45	$\chi^2 = 0.074$	17	13	30	$\chi^2 = 0.553$
	Joint	46	34	80	df = 1	61	34	95	df = 1
	Total	73	52	125	P>0.05 s=ns	78	47	125	P>0.05 s=ns
5	Parity								
	Primi	49	31	80	$\chi^2 = 2.194$	55	30	85	$\chi^2 = 1.392$
	Second Delivery	23	18	41	df = 2	22	17	39	df = 2
	Third (or) above	1	3	4	P>0.05 s=ns	1	0	1	P>0.05 s=ns
	Total	73	52	125		78	47	125	
II	Neonatal Data								
6	Gender								
	(i) Male	29	23	52	$\chi^2 = 0.254$	45	29	74	$\chi^2 = 0.195$
	(i) Female	44	29	73	df = 1	33	18	51	df = 1
	Total	73	52	125	P>0.05 s=ns	78	47	125	P>0.05 s=ns
7	Gestational Weeks During Birth								
	Babies born between 34 to 35 weeks of gestation	25	44	69	$\chi^2 = 0.478$	48	30	78	$\chi^2 = 0.066$
	Babies born between 35 to 36 weeks of gestation	17	39	56	df = 1	30	17	47	df = 1
	Total	63	62	125	P>0.05 s=ns	74	51	125	P>0.05 s=ns
III	Clinical Data								
8	Type of Birth								
	Normal vaginal delivery	38	29	67	$\chi^2 = 0.168$	45	22	67	$\chi^2 = 1.397$
	Cesarean Birth	35	23	58	df = 1	33	25	58	df = 1
	Total	73	52	125	P>0.05 s=ns	78	47	125	P>0.05 s=ns

The table describes the association between demographic variables such as ages, education, occupation, parity of preterm infant mothers and their type of family with weight gain of preterm infants. Similarly genders, type of birth, gestational week on birth of preterm infants were also been associated with weight gain of preterm infants. On pre test assessment there was no significant association mentioned between demographic variable and neonatal outcome for preterm infants on both study and control group (P>0.05).

CONCLUSIONS

The effectiveness of Sensory Nursing Intervention was analyzed and interpreted by measuring the improvements in weight of the baby. The improvements of the weight of the babies were measured at birth and after that on four occasions Viz. 1st day, 6th day, 18th day and 30th day. The improvements of the weight of babies were compared from pretest assessment. The assessments were performed on 1st and 30th day respectively. The above statistics were compared

within the groups to assess the improvement of Sensory Nursing Intervention and its effectiveness and was also compared between the Study and control groups of the respective statistics. There was statistically significantly excess of 583.8 gm increase weight of study group was attributed to the effectiveness of nursing sensory intervention.

REFERENCES

1. Hannah Blencowe et al. Born Too Soon: The global epidemiology of 15 million preterm births. *Reproductive health* 2013 Nov 15 ; 10
2. Kounteya Sinha . India shares highest preterm birth burden. *The Times of India* 2012 June 8.
3. Polit Dense, F. *Nursing research – principles and methods.* (2010). Philadelphia: Lippincott Company.
4. Polit D, Hungler B . *Data analysis and interpretation.* Nursing Research, Lippincott ,2012 London.
5. Melinda Caskey, Bonnie Stephens, Richard Tucker, Betty Vohr. Adult Talk in the NICU with Preterm Infants and Developmental Outcomes. *American Academy of Pediatrics*, 2014 March, 133 (3).
6. Alexandra R. Webb, Howard T. Heller, Carol B. Benson, and Amir Lahav. Mother's voice and heart beat sounds elicit auditory plasticity in the human brain before full gestation. *Proceedings of the National Academy of sciences of United States of America*, 2015 Jan 28; 112 (10): 3152 – 3157.
7. Ulrika Aden. Maternal singing for preterm infants during kangaroo care comforts both the mother and baby. *Acta Paediatrica*, 2014 Sep 11; 103 (10): 995 – 996.
8. Miguel A. Diego, Tiffany Field, Maria Hernandez-Reif. Preterm infant weight gain is increased by massage therapy and exercise via different underlying mechanisms. *Early human development*. 2014. Mar; 90 (3): 137 -140
9. Bahia Abdallaha, Lina Kurdahi Badr, Mirvat Hawwari. The efficacy of massage on short and long term outcomes in preterm infants. *Infant behavior and development*. 2013 Dec; 36(4): 662 – 669.
10. Medoff-Cooper, Barbara et al., Multisensory Intervention for Preterm Infants Improves Sucking Organization. *Advances in Neonatal Care* 2015 April; 15(2) : 142 -149.
11. Jakob Frie et al. Extremely Preterm-Born Infants Demonstrate Different Facial Recognition Processes at 6-10 Months of Corrected Age. *The Journal of Pediatrics*. 5 March 2016:
12. Manuela Filippa et al, Live maternal speech and singing have beneficial effects on hospitalized preterm infants. *Acta Paediatrica* October 2013; 102 (10): 1017 – 1020.
13. Odoardo Picciolini et al. Early exposure to maternal voice: Effects on preterm infants development. *Early Human development*. June 2014; 90 (6) 287 -292

